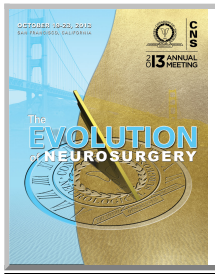

Alteration of the Ki-67 Proliferative Index of Intracranial Tumors Following Surgical Resection With or Without Adjuvant Radiation or Chemotherapy

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Introduction

The Ki-67 proliferative index is a widely accepted assay for cycling tumor cells. While it does not substitute for World Health Organization (WHO) grading, the Ki-67 index may correlate with the biological activity of selected tumors and may change in response to adjuvant treatment.

Methods

A retrospective review of 3,900 consecutive patients undergoing intracranial surgical resection at the University of Pittsburgh Medical Center was conducted. Of these patients, 110 had multiple resections with more than two Ki-67 indices – 42 meningiomas, 54 gliomas (astrocytomas, oligodendrogliomas, and gangliogliomas), and 14 other tumors (chordomas, chondrosarcomas, hemangioblastomas, pituitary adenomas, and neurofibromas) were studied. The first and second Ki-67 indices, time interval between resections, WHO grade, and treatment with radiation and/or chemotherapy were recorded for each patient. Data was evaluated for significant differences ($p<0.05$).

Results

Median Ki-67 indices for both initial and subsequent surgical resections were 10%. The median time interval between surgical procedures was 9 months. Significant increases in Ki-67 were noted when the interval between resections was 9 months or more ($p=0.009$) and/or the initial Ki-67 was <10% ($p=0.032$). Furthermore, WHOII meningiomas were more likely to have a higher Ki-67 on second resection than WHOI meningiomas ($p=0.051$). Radiation-treated meningiomas demonstrated higher second Ki-67 ($p=0.022$). Furthermore, WHOIV gliomas had a higher initial Ki-67 ($p<0.0001$) and decreased Ki-67 on subsequent resection ($p=0.013$) compared to WHOI-III gliomas. The time interval between resections was shorter for WHOIV tumors ($p<0.0001$). Radiation-treated WHOIV tumors decreased Ki-67 following adjuvant treatment ($p=0.005$). WHOI-III gliomas increased second Ki-67, irrespective of adjuvant treatment. Patients undergoing adjuvant treatment with radiation and/or chemotherapy were associated with delayed repeat surgical intervention ($p=0.006$).

Conclusions

Cytoreductive surgery plays distinct roles in the treatment of various intracranial tumors. Ki-67 indices can be used to inform clinical decision-making and characterize responses to treatment in patients undergoing repeat surgical resection of their lesion(s).

Learning Objectives

By the conclusion of this session, participants should be able to: (1) Describe the alteration of Ki-67 proliferation rates of intracranial tumors, including meningiomas and gliomas; (2) Understand the effect of radiation and/or chemotherapy on tumor Ki-67 proliferation rates; and (3) Identify counseling strategies for patients with progressive or recurrent intracranial tumors by understanding the Ki-67 proliferation rate and tumor biology.

References

1.Faraji, AH et al, In Press.